

October 15, 1952

Dr. B. D. Davis
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Dear Bernie:

There isn't anything in your letter to Bernstein in which I would not acquiesce, possibly including even your implied, mild rebuke about "prototroph". When Ryan and I first started to use it in the lab (mainly to avoid committing ourselves on the genetic basis of meiotrophic mutations of leucine-less *Neurospora*), I was not aware of its prior application. Before our paper was published, as I remember it, I ran into the term as a synonym for autotroph. Most of the people I asked had never heard of it, so that it seemed thoroughly obsolete in that usage, and as you seem ready to agree, I hope it remains that way. I stuck a bit at "ischnotroph" (for reasons of euphony), but meiotroph seems ok, and will fill a definite need in special circumstances. If I have used prototroph in a similar context, it was on the supposition that the ancestral form was indeed auxo-autotrophic, and that the various auxotrophs isolated from the wild were accidentals, rather than the wild type that one might choose as a frame of reference for the group. This is so ethereal an argument that I would be pleased not to talk about "prototrophs" at all in such cases, but rely on the more operational definition that you propose for meiotroph. It is doubtful that you will find it necessary to use prototroph extensively for the nutritionally exacting wild type, as there will generally be no simple procedure for returning to it from meiotrophic mutants. Strictly speaking, such usage would be quite correct, but I think it would avoid confusion not to insist on it. That is, I would suggest avoiding the use of the term prototrophic where it does not roughly correspond to meiotrophic as well, except where it seems desirable to contrast the terms.

I do have one suggestion which may be too drastic, namely to throw out all of these words based on "troph", except for syntroph. We now know something of the biochemical basis of nutritional dependence, namely that it is the inverse of synthesis. I wonder if it would not be more constructive to focus attention on biochemical competence rather than on requirements. An expression along the lines of holosynth conveys much more to me than autotroph. I am sure you will be able to find other more appropriate roots, but even a word like anauxosynthetic is inherently more meaningful than auxoheterotrophic. If it is time for such a proposal, I would imagine that you would be the appropriate person to develop it.

The main point of this letter is something rather less trivial, the paper by Plough's group in the September PNAS, which you must have seen in juxtaposition to yours'. His report seems to me quite incredible, and includes a number of points of internal doubt in ~~addition~~ addition to the discrepancy between his general results, and those in the work that Norton, Stocker and I have done here. (For a time, it looked as if one of Stocker's findings represented ~~an~~ exceptional instance of linked transduction, but this has now been resolved otherwise).

There are several things in the paper that make me wonder if the facts have been correctly established. The single-step mutation leading for requirements for arginine, methionine and aspartic acid (533-1159) is already suspicious, but not impossible. The separation among the transducees of requirements for isoleucine and valine (table 2) seems utterly implausible, as are the recovery of sexauxotroph recombinants on a medium which should not have permitted their development. One notes also that mixed culture was less effective than growing one type in a simple filtrate of the other.

My first reaction is that there is no more substantial basis to this report than to the mutants with alternative requirements, and that one had best forget all about it. There is always some chance that a new phenomenon is lurking behind this confusion, however, and so it should be checked up. I would think that if the multi-auxotroph recombinants can be verified and compared with their parents, then there must be some substantial basis for the story.

You were remarkably successful in penetrating the barriers of confusion on the alternative requirements business, and I conclude that the tactful way in which you handled it left no undue hard feelings. Would you be willing to act as intermediary again, to help straighten out this mess? It is asking a good deal of you, but I don't know whom else to suggest. Zinder and I are already committed in a certain direction, and it could not be denied that we had some ax to grind. Technically, there would not be much to retesting the cultures, and I am confident that you could best handle the diplomatic problem. I would not object, if you felt it wise, to your mentioning that I had suggested your essay at confirmation.

Sincerely,

Joshua Lederberg